ADMACS & ISIS

AVIATION DATA MANAGEMENT & CONTROL SYSTEM

INTEGRATED SHIPBOARD INFORMATION SYSTEM

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ADMACS Brief

- **Overview / Description**
- **Operational Data Flow**
- **Components**
- **Development Approach**
- **IT-21 and Current Configuration**

ADMACS Description

Aviation Data Management and Control System

- **A tactical, real-time Information Management System maintaining data integrity throughout various ship spaces that manage Aircraft Launch and Recovery operations on CV / CVN and LHA / LHD class ships.**
  - **Launch and Recovery Equipment**
  - **Air Traffic Control**
  - **Aviation Maintenance**
  - **Mission Execution (Air / Load Plan)**
  - **Aviation Weapons Stowage and Handling**
  - **Landing Signaling Officer (LSO)**
  - **Ship to Shore Movement & Tactical Aircraft Control (Amphib)**
- **Interface with other shipboard systems**

ADMACS Description

Aviation Data Management and Control System

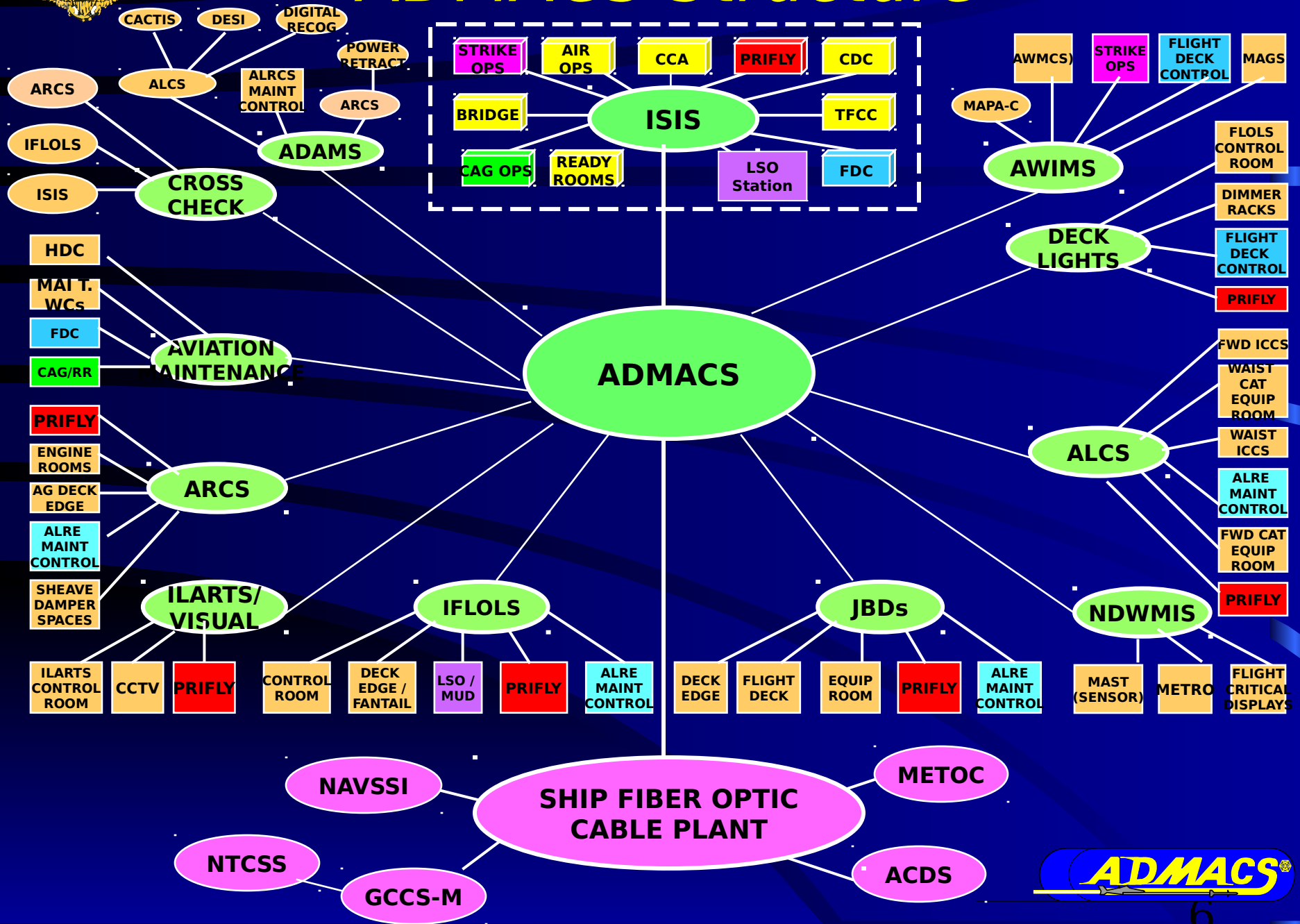
- **The program is comprised of the following elements:**
  - **Physical Infrastructure - Data Distribution, Processing, Integrity between Command Centers, Component Systems, and External Interfaces through a resilient open architecture.**
  - **Component Systems - ORD identifies other systems towards the preparation and execution for launch & recovery operations**
  - **Configuration Management - Insure proper installation and availability of functions for multiple Navy platforms and external interfaces supported.**
  - **Multi-User Flight Operations Database supporting ship / BG community.**

System Characteristics

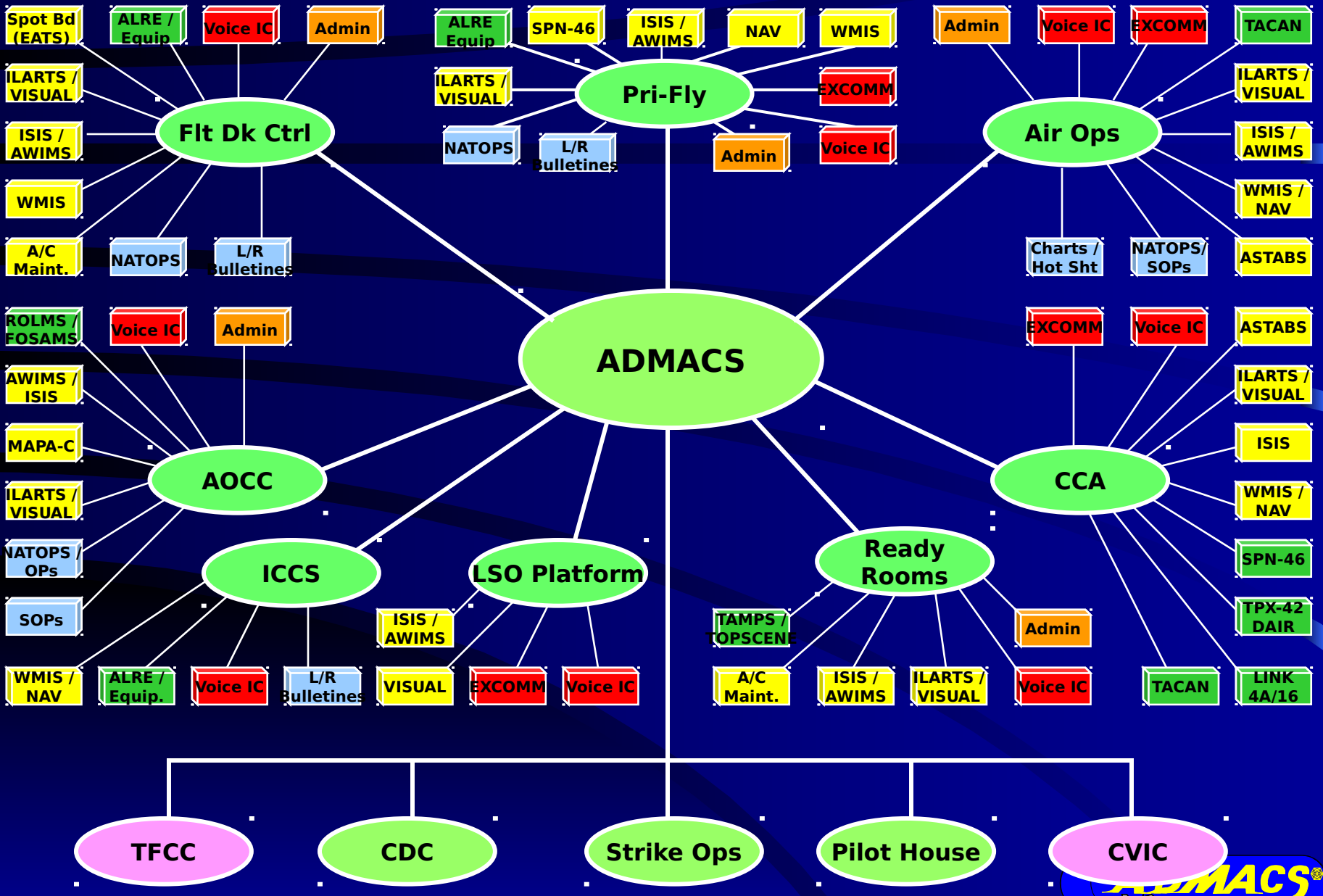
ADMACS Description

- **Supports Tactical Operations ⇨ Redundancy**
- **Common Flight Operational Picture**
- **Streamlines Process from Planning through execution**
- **Reduces workload for Support Personnel**
- **Data Integrity (Collect Information from its Source)**
- **Reduces Need on Voice Communications**
- **Distributes Information to Other Operators / Users**
- **Allows Work Centers to Operate through System failure**
- **Human System Integration**
  - **Inter & Intra Work Center Work Flow**
  - **Operator Needs**

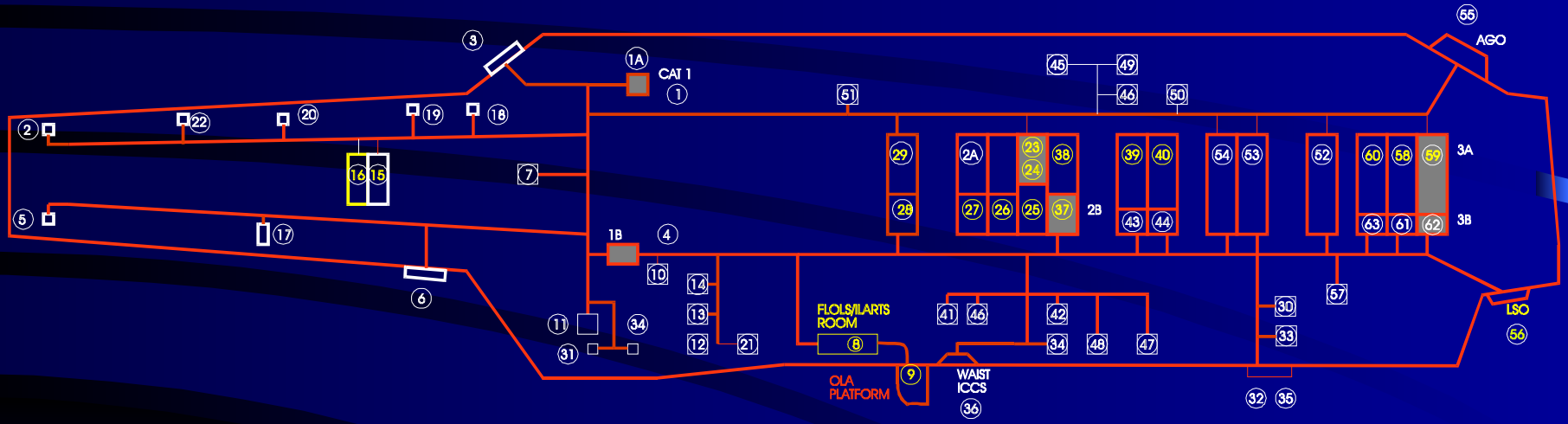
ADMACS Structure



Flight Operations Work Centers



Projected Configuration for Gallery Deck (03 Level)



Yellow -- Block 0

White -- Block 2

NAVAL AVIATION SYSTEMS TEAM
Cyclic
•Commander's Intent
•Begin ATO
•High Level Tasking
Receive Tasking
•Strike Team Develops Mission to Satisfy Tasking
•Aircraft, Fuel, Munitions etc. are determ
Mission Planning
Carrier "Deck" Operations
•Prepare Aircraft
•Weapons Movement
•Fuel Pods
Mission Execution
•Mission Operations
•CAP
•Real Time Re-tasking
Debrief
•Intel Debrief
•Air Crew Debrief
Carrier Flight Operations
ADMACS

Flight Operations Data Flow

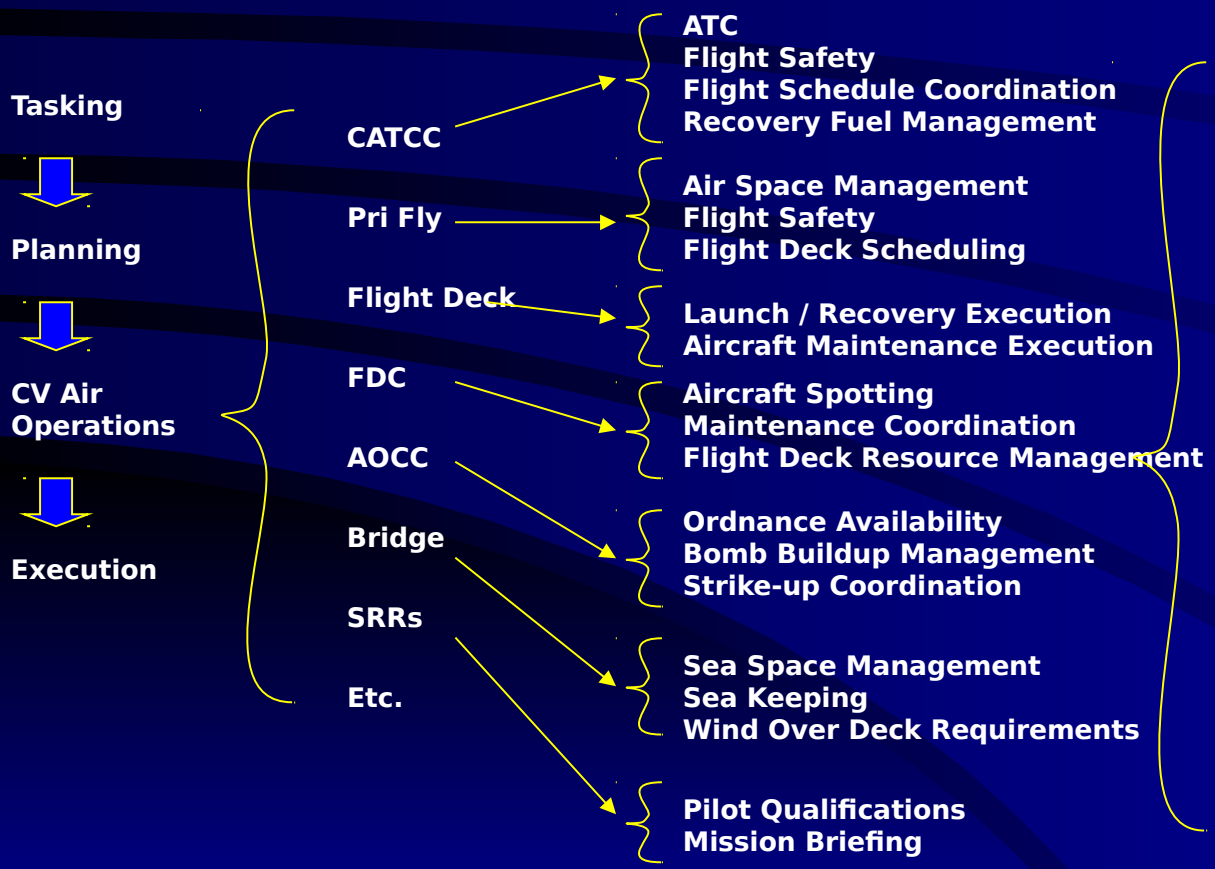
Tasking	Functions Performed	Allocated to: → Depts./WCs	Wk
ATO	Strike Planning Preparation (Pre-Flight Quarters) Launch Aircraft Mission Execution Recover Aircraft Post Recovery Maintenance Actions Aircraft Related Ship Related (ALRE, SE) Debrief		

Tiered Approach to Realizing Knowledge Based Work Centers

Process - Data / Information - Product Model

(Distributed Autonomous Agents) (Rules Based Pr

Aviation C⁴I Systems - Work Centers



Aviation C⁴I Systems

Initial inroads into developing Knowledge based systems involves converting current systems composed of sound powered phones and grease boards into distributed inform

syste

This captures the data necessary for future information integration and the deployment of Knowledge

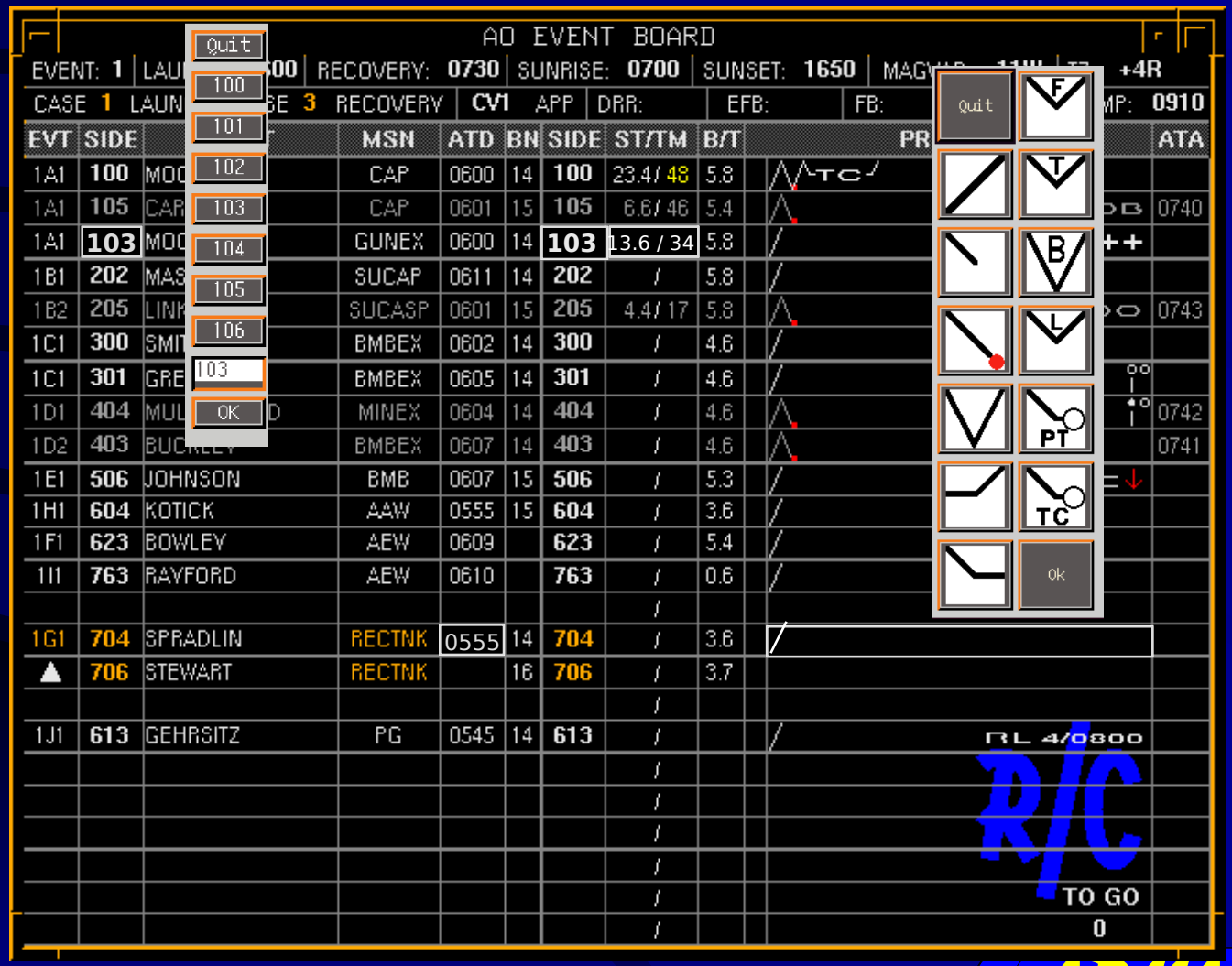
Integrated Shipboard Information System (ISIS)

- **ISIS is the user interface system providing the data display and entry used to manage flight operations data integrated into the work flow of the space**
  - **System engineering application integrated environment collects data utilizing simple point/click functions from Air Operations, Carrier Control Approach, Primary Flight Control & Flight Deck Control**
  - **Information Distribution to the Bridge, LSO, CDC & Ready Rooms**
  - **Historical information is stored and required data logs and historical reports are automatically generated.**
- **ISIS consists of reconfigurable data entry work stations and large screen displays replacing the existing plexi-glass status boards**

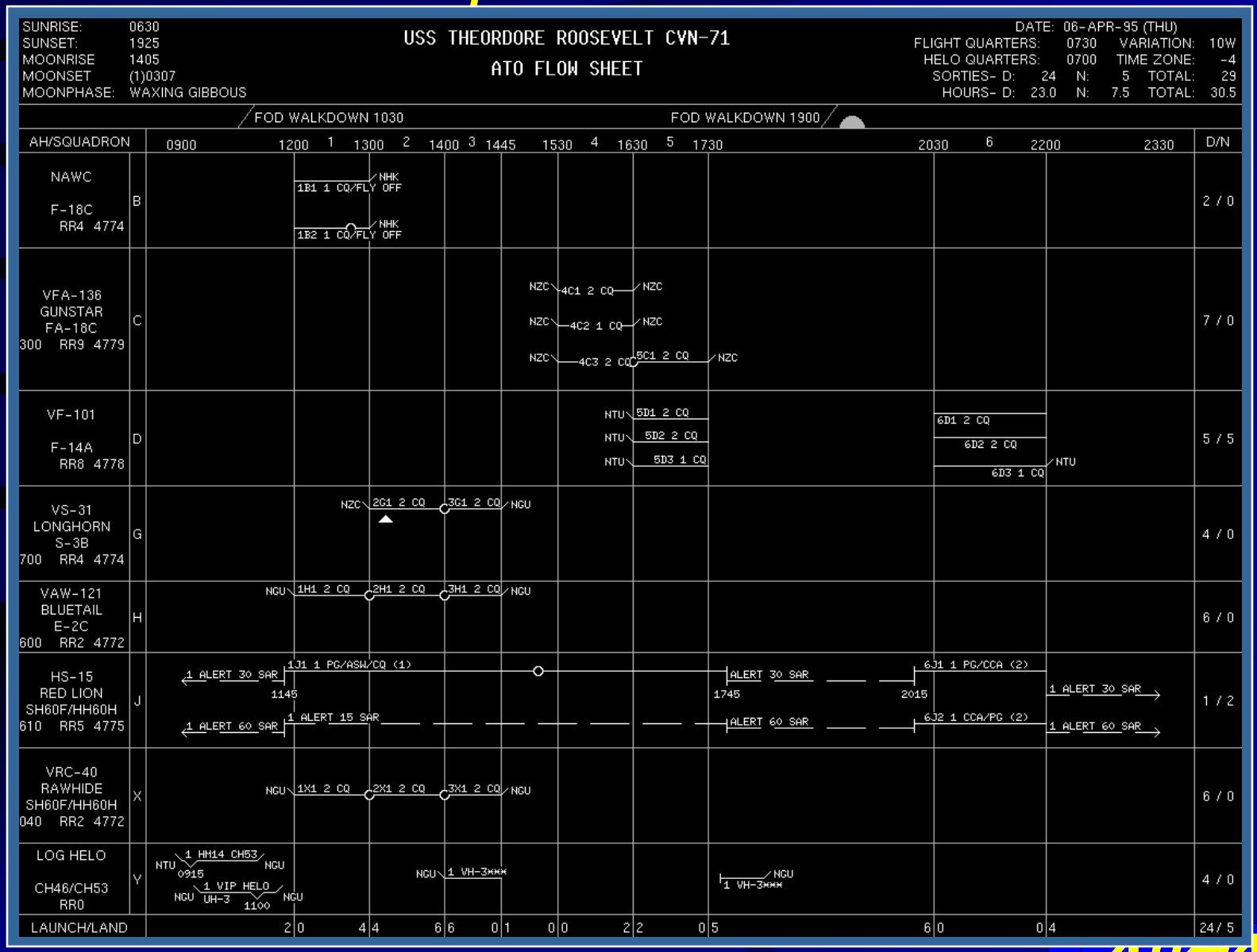
Integrated Shipboard Information System (ISIS)

- **"Rules Based" Data Entry**

- **Who**
- **What**
- **When**
- **Flags**
- **Triggers**



Ship's Air Plan



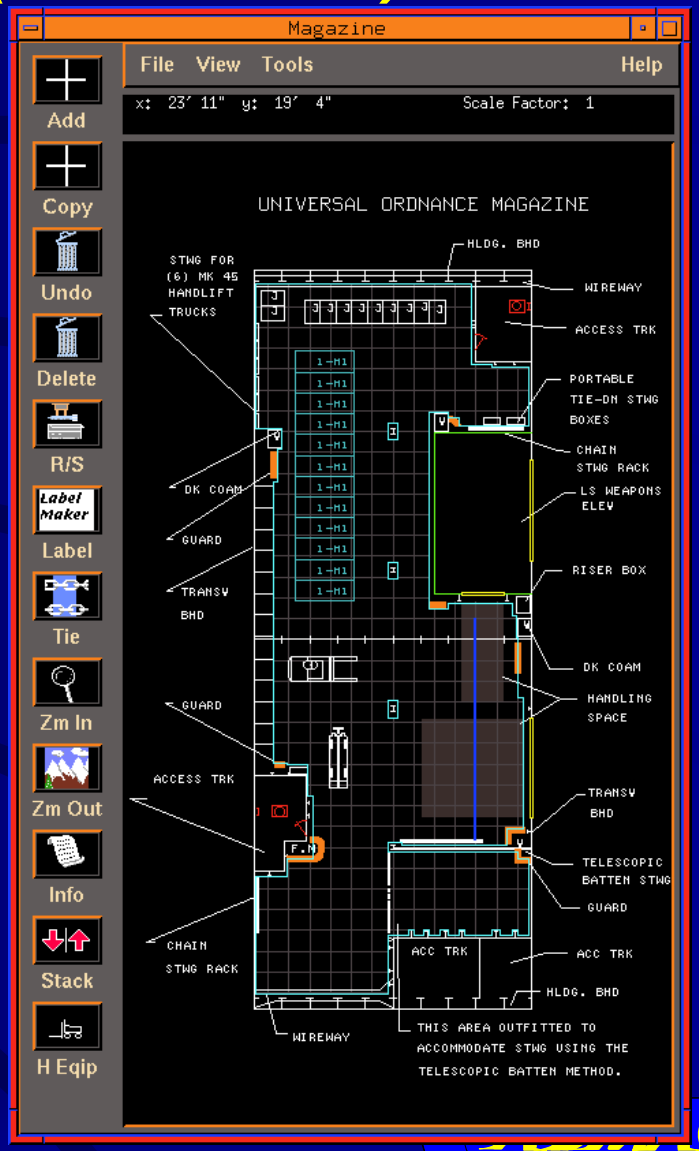
Sorry, No Cartoon

Aviation Weapons Information Management System

- **The AWIMS is a system designed to streamline the communication processes required to support weapons planning, movement, stowage, and status.**
  - **Data is managed through several different mediums between its source and the user (i.e.. Voice IC, digital, grease boards, paper, etc.) which contributes to data latency and errors, thus having a direct impact on ship mission capability and safety.**
  - **AWIMS avoids this creation/ recreation methodology of data handling by utilizing a systems approach to define data sources, their sinks (users), and a single fault tolerant medium to support the communication requirement.**
- **Capability to import/ export data to other tactical type systems aboard the ship in support of strike/ flight operations, thus providing a fully comprehensive/ integrated data information management capability.**

Magazine Arrangement Planning Aid (MAPA-C)

- As part if AWIMS systems in support of advanced mission planning and operations.
- Used by Weapons Department for ordnance movement and stowage aboard CV/CVN and LHD class ships.
- Built in Weapons compatibility checks based on NAVSEA OP 4
- Automatic container / FIUL stack height limitation (based on magazine grid height and forklift mast extension).
- On-Line Help system
- Built in arrangement checks.
- Choice of weapon entry by NALC or weapon selection menu
- Handling equipment, aircraft, and boat templates are available for magazine, hangar bay, and flight deck arrangements



ALRCS Description

- **Uses available sensor and control technologies to modernize launch and recovery control systems**
- **Improve launch and recovery processes**
  - **Automation (Launch / Recovery Parameters)**
  - **Enhance communication**
  - **Modernize human interface**
- **Provide condition based maintenance**
  - **Reduce required maintenance hours**
  - **Reach back maintenance capability**
  - **Embedded Training**

Arresting Gear IFLOLS Cross Check

Goals

- **Reduced Cost of Maintenance**
  - **Reduce number of Individual Systems and Improved Maintainability**
- **Improved Recovery Operations Safety**
  - **Provide Air Boss / LSO with True Closed Loop Cross Check System**
- **Reduce Workload in Primary**
  - **Automate Cross Check System and Eliminate One Work Station in PriFly**

VISUAL
PROGRAM DESCRIPTION

- **Virtual Imaging Systems for Approach & Landing VISUAL**
- **Integrated Electro-Optical Sensor & Display System**
- **Provide LSO/Ship's Company:**
  - **Enhanced Images of Approaching Aircraft**
  - **Critical Recovery Information**
  - **Track/Ident Aircraft Independent of Radars**
- **Provide the LSO with an Integrated Workstation**
- **Growth Potential for 2-Way Comm Link & HMD**
- **COTS/GOTS/NDI Hardware/Software/Firmware**

Automated Spotting Board / EATs

- New system will be installed in Flight Deck Control an will support advanced planning, current ops picture, and training scenarios
- System will be comprised of sensor inputs (Embarked Aircraft Tracking System (EATS)), a main processor (EATS/ADMACS), large screen display (spotting board), and distribution system supporting external interfaces (ADMACS).
- Future P3I will include integration of ISIS, AWIMS, CASEE, and Aircraft Maintenance databases to present a more comprehensive situational picture on the large screen display.
- Lack of training for Aircraft Handler, Air Boss, and “Shooter” were identified as a priority at the last tow OAGsCV(N) OAG (February 98/99).
- Training is the number one priority for CV(N) OAG ESC.

Aviation Maintenance Information Management

- **Interface with NALCOMIS / AMIDD.**
- **Combine Aircraft Operational Data with Aircraft Maintenance Data.**
- **Support EXCOMM Data Interface (fuel, maintenance, etc.)**
- **Link Squadron Maintenance WCs with Flight Deck Control (CAG MC) and Hangar Deck Control.**
- **Improve O-Level Maintenance Turn Around.**
- **Automate Data Entry, Log Requirements.**
- **Work from a single, distributed database .**
- **CASEE Model used for planning maintenance evolutions.**

New Digital Wind Measuring and Indicating System (NDWMIS)

Dynamic Interface Envelopes Integrated with Wind Display

Summary of Information

Planning

- Ship's Air Plan / Load Plan
- Weapons Inventory/Stowage/Movement/Accounting
- ATO (Read)

Flight Operations (Reference / Preparation)

- Aircraft Launch and Recovery Bulletins
- ALRE Status/Information (incl Launch / Recovery Req'ts)
- Pre-Launch Brief (Divert Fields, L/R PIMs, NAVAIDS)
- Pilot Qualifications
- Aircraft Bingo Fuels (Distance, winds, …)
- Communication Plan Information
- Alert Aircraft Status (Aircraft, mission, pilot, posture)
- Equipment status (radar, yellow gear, elevators, …)

Summary of Information
(cont.)

Flight Operations (Execution)

- Airborne Aircraft Status (Aircraft, pilot, mission, fuel (give), ATD, ATA, Traps, Bolters, Wave offs, T&G, …)
- Aircraft Status (Deck) (incl. Location, gripes, weapons load, …)
- Diverted Aircraft Status
- Divert Fields
- Wind Information (angled/straight/general)
- Aircraft approach parameters (speed, sink rate, line up, …)
- Strike Control (CDC) (Call sign, Controller, Mode 4 status, …)

Reports

- Daily Air Ops Summary
- Master Flight Log
- Pilot Summary

Development Approach

- **Fleet Project Teams provide support for:**
  - **User Community**
  - **Deficiencies of existing system**
  - **Characterize Space / Environment / Data Requirements**
  - **Approve Automation Features**
  - **Work with HSI Team on Workload / Manning / Training**
  - **Involvement throughout Development**
- **Mock Ups**
- **Ship Transition**
- **Working Groups / Fleet Initiatives / Trends**

IT-21 & Current Configuration

ISIS 1st Install Jan 1995 - CVN 73

2nd Install Jul 1998 - CVN 71

Current Configuration (for ISIS**)**

- **Utilization of shipboard fiber (Level 1 compliance)**
- **Use of TAC 4 equipment**
- **ATM Switches (Nortel)**
- **Unix based Servers, HP-UX OS**
- **Limited Function end stations**
- **Client Server Applications**

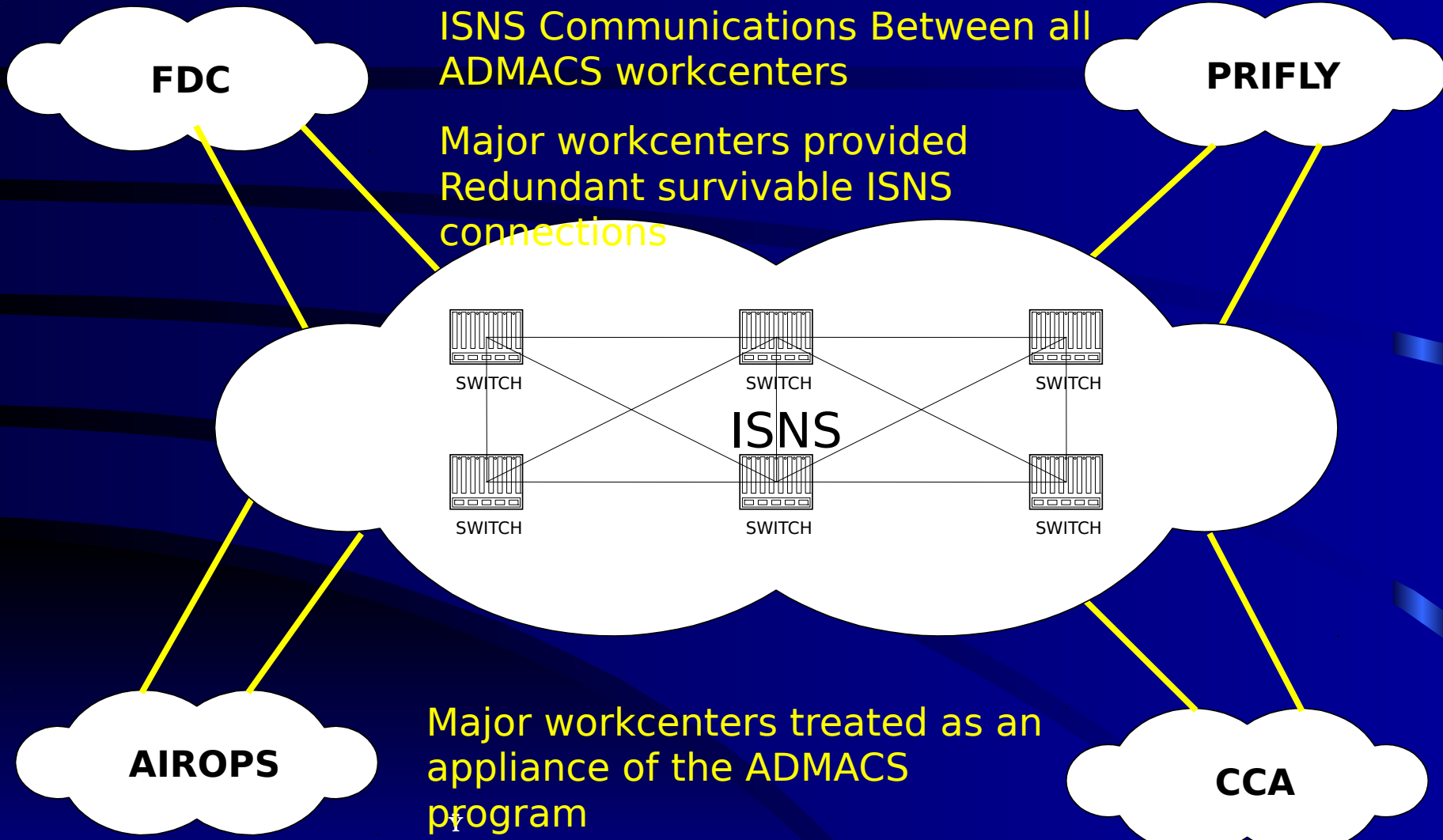
ADMACS - IT21 (ISNS) Efforts

- **Began Investigating incorporation of IT21 network switch (Xylan)**
- **Feb 00: Began Network Integration discussions w/ ISNS team:**
  - **Gained concurrence on our IT-21 migration plan**
  - **Established working group between ADMACS-ISNS (1st meeting 18 Apr 2000) to integrate ADMACS into ISNS**
- **Following Execution Guidance Plan For ISNS Integration**
  - **Submitted NCR (NIN-OO-021) To SPAWAR: 3 Mar 00**
- **Established ADMACS & ISIS working group to analyze and define ADMACS IT21 level 3 solution**
  - **Convert Air Plan, SRR, non-mission critical functions to NT**
- **4th Qtr FY03: Level 3 Compliance**

IT-21 Level 3 Migration Plan Concept

ISNS Communications Between all ADMACS workcenters

Major workcenters provided Redundant survivable ISNS connections



Major workcenters treated as an appliance of the ADMACS program

Utilizes QPL/PPL approved hardware

Summary

- **ADMACS & ISIS is IT-21 Level 1 compliant**
- **Migrating to Level 2 / 3 compliance**
- **Working closely with SPAWAR (ISNS Program)**